



# FACT SHEET

## USAF Fact Sheet

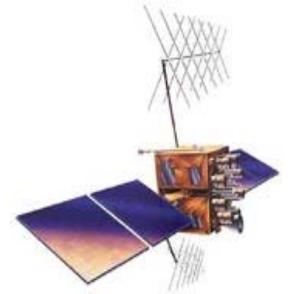
# NAVSTAR Global Positioning System

## Mission

The Navstar Global Positioning System (GPS) is a space-based radio-positioning system consisting of a constellation of more than 20 orbiting satellites that provides global navigation and timing information to users. In addition to the satellites, the system consists of a worldwide satellite control network and GPS receiver units that translate satellite signals into position information. The system is operated and controlled by the 50th Space Wing located at Falcon Air Force Base, Colo.

## Features

GPS satellites orbit the earth every 12 hours emitting continuous navigation signals. With the proper equipment, users can receive these signals to calculate time, location and velocity. The signals are so accurate, time can be figured to within a millionth of a second, velocity within a fraction of a mile per hour and location to within a few meters. Positioning accuracy for military users is at least 7-10 meters (22 - 32 feet) while accuracy for civilian user is about 70 - 100 meters (229 - 328 feet).



GPS provides the following 24-hour worldwide service:

**Accurate three-dimensional location information  
(providing latitude, longitude and altitude readings)**

**Accurate velocity information**

**Passive all-weather operations**

**Precise timing services**

**Continuous real-time information**

**Support to an unlimited number of users and areas**

The Delta II expendable launch vehicle is used to launch GPS satellites from Cape Canaveral Air Force Station, Fla., into six circular orbits of nearly 11,000 nautical miles. While orbiting the earth, the system transmits signals on two

**different L-band frequencies.**

## **Background**

**The Navstar GPS system is managed by the Navstar GPS Joint Program Office at Air Force Materiel Command's Space and Missile Systems Center at Los Angeles Air Force Base, Calif.**

**There are four generations of the GPS satellite: the Block I, Block II/IIA, Block IIR and Block IIF. Block I satellites were used to test the principles of the system, and lessons learned from these 11 satellites were incorporated into later blocks. Blocks II and IIA satellites make up the current constellation.**

**Block IIR satellites will replace II/IIA satellites as they reach the end of their service life. Block IIR satellites are able to determine their own position by performing inter-satellite ranging and have reprogrammable satellite processors enabling problem fixes and upgrades in flight. They also have increased satellite autonomy and radiation hardness, and have the ability to be launched into any of the required GPS orbits with a 60-day notice. Block IIR satellites require fewer ground contracts to maintain the constellation, and will be launched through the year 2002.**

**Block IIF satellites are the fourth generation of the navigation satellites and will be used as sustainment vehicles. This block will have an improved design life of 12.7 years and provide a dramatic increase in the growth space for additional payloads and missions.**

**The GPS master control station, operated by the 2nd Space Operations Squadron at Falcon AFB, Colo., is responsible for monitoring and controlling the GPS satellite constellation. The GPS-dedicated ground system consists of five monitor stations and four ground antennas located around the world.**

**The monitor stations use GPS receivers to passively track the navigation signals of all satellites. Information from the monitor stations is then processed at the master control station and used to update the satellite navigation messages.**

**The master control station crew then sends updated navigation information to GPS satellites through ground antennas using an S-band signal. The ground antennas are also used to transmit commands to satellites and to receive satellites' telemetry data.**

**GPS was put to the test during Operations Desert Shield and Desert Storm where coalition forces relied heavily on GPS to navigate the featureless desert of Southwest Asia.**

**GPS is being integrated into nearly all facets of the modern**

**battlefield. Its highly accurate navigation signals will help rescue downed aircrews with the development of new GPS survival radios, and lightweight GPS receivers have become a standard issue for some American and allied forces-forward air controllers, pilots, tank drivers and ground troops all use GPS.**

## **General Characteristics**

### **Primary Function:**

**Precise navigation, timing and velocity information worldwide**

### **Primary Contractors:**

**Block I and II/IIA, Rockwell;  
Block IIR, Lockheed Martin;  
Block IIF, Boeing - North American**

### **Power Plant:**

**Block IIA, Solar panels generating 1,000-1,050 watts;  
Block IIR, solar panels generating 1,130 watts**

### **Launch vehicle: Delta II Weight:**

**Block IIA, 3,670 pounds (1,816 kilograms);  
Block IIR, 4,480 pounds (2,217 kilograms) Height:  
Block IIA, 136 inches (3.4 meters);  
Block IIR, 70 inches (1.7 meters)**

### **Width (includes wingspan):**

**Block IIA, 208.6 inches (5.3 meters);  
Block IIR, 449 inches (11.4 meters)**

### **Orbit altitude:**

**Block IIA, 10,988 nautical miles;  
Block IIR, 10,898 nautical miles**

### **Design life:**

**Block II/IIA, 7.5 years;  
Block IIR, 10 years**

### **Date of First Launch:**

**1978 Date Constellation**

### **Operational: July 1995 (at full operational capacity) Inventory:**

**Block II/IIA, 27 fully operational satellites;  
contract for 21 Block IIR;  
and contract and options for 33 Block IIF**

## **NAVIGATION INFORMATION SERVICE**

**The U.S. Coast Guard operates and maintains the Navigation Information Service for civilian GPS users. It can be reached at (703) 313-5900, Monday through Friday, from 8 a.m. to 4 p.m. Eastern time.**

**POINT OF CONTACT Air Force Space Command, Public Affairs Office; 150 Vandenberg, Suite 1105; Peterson AFB, Colo. 80914-4500; DSN 692-3731 or (719) 554-3731. March 1998**

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